

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Jeffery S. Hess Examiner: Unknown
Serial No.: Unknown (Parent Serial No. XX/XXX,XXX) Art Unit: Unknown
(Parent Docket No. 10010488-1)
Filed: Herewith (Parent Filing Date 01/31/2002) Docket No.: 10010488-2
Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID
EJECTION DEVICE

PRELIMINARY AMENDMENT

BOX PATENT APPLICATION

Commissioner for Patents

Washington, D.C. 20231

Sir/Madam:

This Preliminary Amendment modifies the Continuation Application filed herewith.
Prior to examination of the Continuation Application, please amend as follows:

IN THE SPECIFICATION

Following the Title, please insert the following paragraph:

-- This application is a Continuation of U.S. Patent Application Serial
No. XX/XXX,XXX, entitled "SUBSTRATE AND METHOD OF FORMING
SUBSTRATE FOR FLUID EJECTION DEVICE", having Attorney Docket
No. 10010488-1, filed on January 31, 2002, assigned to the assignee of the
present invention, and incorporated herein by reference. --

Please amend the Summary of the Invention as follows:

delete page 2, lines 6-15 (all inclusive) and insert the following:

-- One aspect of the present invention provides a method of forming an
opening through a substrate. The method includes etching a first portion of
the opening into the substrate from a first side, etching a plurality of second
portions of the opening into the substrate from a second side opposite the first
side, continued etching of at least one of the first portion and the plurality of

2009-04-23 14:00:00

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

second portions of the opening to the other of the first portion and the plurality of second portions of the opening, and overetching each of the second portions of the opening at an interface between the first portion and each of the second portions of the opening, including communicating each of the second portions with an adjacent one of the second portions. --

IN THE ABSTRACT

Please replace the Abstract with the following rewritten Abstract:

-- A method of forming an opening through a substrate includes etching a first portion of the opening into the substrate from a first side, etching a plurality of second portions of the opening into the substrate from a second side opposite the first side, continued etching of at least one of the first portion and the plurality of second portions of the opening to the other of the first portion and the plurality of second portions of the opening, and overetching each of the second portions of the opening at an interface between the first portion and each of the second portions of the opening, including communicating each of the second portions with an adjacent one of the second portions. --

IN THE CLAIMS

Please cancel claims 1-71.

Please add new claims 72-112 as follows:

72. (New) A method of forming an opening through a substrate, the method comprising:
- etching a first portion of the opening into the substrate from a first side;
 - etching a plurality of second portions of the opening into the substrate from a second side opposite the first side;
 - continued etching of at least one of the first portion and the plurality of second portions of the opening to the other of the first portion and the plurality of second portions of the opening; and

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

overetching each of the second portions of the opening at an interface between the first portion and each of the second portions of the opening, including communicating each of the second portions with an adjacent one of the second portions.

73. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes forming a plurality of third portions of the opening, and wherein communicating each of the second portions with an adjacent one of the second portions includes communicating each of the second portions with an adjacent one of the second portions via the third portions.

74. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes etching from the interface between the first portion and each of the second portions of the opening toward the second side.

75. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes overetching at least one side of each of the second portions of the opening.

76. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes overetching two opposing sides of at least one of the second portions of the opening.

77. (New) The method of claim 72, further comprising:
overetching the first portion of the opening at the interface between the first portion and each of the second portions of the opening.

78. (New) The method of claim 72, wherein communicating each of the second portions with an adjacent one of the second portions includes communicating at least one side of each of the second portions with at least one side of an adjacent one of the second portions.

79. (New) The method of claim 72, wherein communicating each of the second portions with an adjacent one of the second portions includes communicating one side of at least one

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

of the second portions with one side of an adjacent one of the second portions and communicating another side of the at least one of the second portions with one side of another adjacent one of the second portions.

80. (New) The method of claim 72, wherein communicating each of the second portions with an adjacent one of the second portions includes communicating at least one of the second portions with two adjacent ones of the second portions.

81. (New) The method of claim 72, wherein etching the first portion of the opening includes converging the first portion of the opening from the first side toward the second side, wherein etching the plurality of second portions of the opening includes converging each of the second portions of the opening from the second side toward the first side, and wherein overetching each of the second portions of the opening includes diverging at least one of the second portions of the opening from the second side toward the first side.

82. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes, in a first direction, diverging at least one of the second portions of the opening from the second side toward the first side and, in a second direction, converging each of the second portions of the opening from the second side toward the first side.

83. (New) The method of claim 72, wherein etching the first portion of the opening includes anisotropically wet etching into the substrate from the first side.

84. (New) The method of claim 72, wherein etching the plurality of second portions of the opening includes anisotropically wet etching into the substrate from the second side.

85. (New) The method of claim 72, wherein overetching each of the second portions of the opening includes anisotropically wet etching at the interface between the first portion and each of the second portions of the opening.

86. (New) A method of forming a substrate for a fluid ejection device, the method comprising:

etching into the substrate from a first side, including forming a first slot in the substrate;

etching into the substrate from a second side opposite the first side, including forming a plurality of second slots in the substrate;

continuing etching into the substrate from at least one of the first side and the second side toward the other of the first side and the second side, including communicating the first slot and the plurality of second slots; and

etching into the substrate at an interface between the first slot and each of the second slots, including communicating each of the second slots with an adjacent one of the second slots.

87. (New) The method of claim 86, wherein etching into the substrate at the interface between the first slot and each of the second slots includes etching toward the second side of the substrate at an angle to the second side.

88. (New) The method of claim 86, wherein etching into the substrate at the interface between the first slot and each of the second slots includes etching along at least one side of each of the second slots.

89. (New) The method of claim 86, wherein etching into the substrate at the interface between the first slot and each of the second slots includes etching along two opposing sides of at least one of the second slots.

90. (New) The method of claim 86, wherein etching into the substrate at the interface between the first slot and each of the second slots includes etching toward the first side of the substrate at an angle to the first side.

91. (New) The method of claim 86, wherein forming the first slot in the substrate includes converging the first slot from the first side toward the second side, wherein forming the plurality of second slots in the substrate includes converging the second slots from the second side toward the first side, and wherein etching into the substrate at the interface

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

between the first slot and each of the second slots includes diverging at least one of the second slots from the second side toward the first side.

92. (New) The method of claim 86, wherein etching into the substrate at the interface between the first slot and each of the second slots includes, in a first direction, diverging at least one of the second slots from the second side toward the first side and, in a second direction, converging each of the second slots from the second side toward the first side.

93. (New) The method of claim 86, wherein forming the first slot includes forming a pair of first slots in the substrate, wherein forming the plurality of second slots includes forming a first plurality of second slots and a second plurality of second slots in the substrate, and wherein communicating the first slot and the plurality of second slots includes communicating a first of the pair of first slots and the first plurality of second slots and communicating a second of the pair of first slots and the second plurality of second slots.

94. (New) The method of claim 93, wherein communicating each of the second slots with an adjacent one of the second slots includes communicating each of the first plurality of second slots with an adjacent one of the first plurality of second slots and communicating each of the second plurality of second slots with an adjacent one of the second plurality of second slots.

95. (New) The method of claim 93, wherein forming the pair of first slots in the substrate includes spacing the first slots on the first side of the substrate, and wherein forming the first plurality of second slots and the second plurality of second slots in the substrate includes spacing the first plurality of second slots on the second side of the substrate and aligning the first plurality of second slots with the first of the pair of first slots and includes spacing the second plurality of second slots on the second side of the substrate and aligning the second plurality of second slots with the second of the pair of first slots.

96. (New) The method of claim 95, wherein spacing the first plurality of second slots on the second side of the substrate and spacing the second plurality of second slots on the second

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

side of the substrate includes substantially aligning the first plurality of second slots with the second plurality of second slots on the second side of the substrate.

97. (New) The method of claim 95, wherein spacing the first plurality of second slots on the second side of the substrate and spacing the second plurality of second slots on the second side of the substrate includes staggering the first plurality of second slots with the second plurality of second slots on the second side of the substrate.

98. (New) The method of claim 95, wherein spacing the first plurality of second slots on the second side of the substrate and spacing the second plurality of second slots on the second side of the substrate includes overlapping the first plurality of second slots with the second plurality of second slots on the second side of the substrate.

99. (New) A substrate for a fluid ejection device, the substrate comprising:
a first side having a first slot formed therein; and
a second side opposite the first side having a plurality of second slots formed therein, wherein each of the second slots communicate with the first slot, and each of the second slots directly communicate with an adjacent one of the second slots.

100. (New) The substrate of claim 99, wherein at least one side of each of the second slots extends at an angle from the second side toward the first side to the first slot.

101. (New) The substrate of claim 99, wherein two opposing sides of at least one of the second slots extends at an angle from the second side toward the first side to the first slot.

102. (New) The substrate of claim 99, wherein the first slot converges from the first side toward the second side, and wherein at least one of the second slots diverges from the second side toward the first side to the first slot.

103. (New) The substrate of claim 99, wherein, in a first direction, at least one of the second slots diverges from the second side toward the first side to the first slot and, in a

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

second direction, each of the second slots converge from the second side toward the first side to the first slot.

104. (New) The substrate of claim 99, wherein the first slot is etched into the first side toward the second side, and wherein each of the second slots are etched into the second side toward the first side and etched at an interface between the first slot and each of the second slots.

105. (New) The substrate of claim 104, wherein each of the second slots are etched from the interface between the first slot and each of the second slots toward the second side at an angle to the second side.

106. (New) The substrate of claim 104, wherein the first slot and each of the second slots are anisotropically wet etched.

107. (New) The substrate of claim 99, wherein the first slot includes a pair of first slots, wherein the plurality of second slots includes a first plurality of second slots and a second plurality of second slots, and wherein each of the first plurality of second slots communicates with a first of the pair of first slots and each of the second plurality of second slots communicates with a second of the pair of first slots.

108. (New) The substrate of claim 107, wherein each of the first plurality of second slots communicates with an adjacent one of the first plurality of second slots and each of the second plurality of second slots communicates with an adjacent one of the second plurality of second slots.

109. (New) The substrate of claim 107, wherein the pair of first slots are spaced on the first side, and wherein the first plurality of second slots are spaced on the second side and aligned with the first of the pair of first slots and the second plurality of second slots are spaced on the second side and aligned with the second of the pair of first slots.

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

110. (New) The substrate of claim 109, wherein the first plurality of second slots are substantially aligned with the second plurality of second slots on the second side.

111. (New) The substrate of claim 109, wherein the first plurality of second slots are staggered to the second plurality of second slots on the second side.

112. (New) The substrate of claim 109, wherein the first plurality of second slots overlap the second plurality of second slots on the second side.

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

REMARKS

This Preliminary Amendment modifies the Continuation Application filed herewith. With this Preliminary Amendment, claims 1-71 have been cancelled and claims 72-112 have been added. Claims 72-112, therefore, are presented for consideration and allowance.

Applicants request that the filing fee be calculated based on entry of this Preliminary Amendment.

Applicants hereby request consideration and approval of the changes to the Specification and the Abstract, as presented above.

Preliminary Amendment

Applicant: Jeffery S. Hess

Filed: Herewith

Docket No.: 10010488-2

Title: SUBSTRATE AND METHOD OF FORMING SUBSTRATE FOR FLUID EJECTION DEVICE

CONCLUSION

With this Preliminary Amendment, claims 1-71 are cancelled and claims 72-112 are added. Applicants respectfully submit that pending claims 72-112 are all in condition for allowance and requests allowance of all pending claims.

Any inquiry regarding this Preliminary Amendment should be directed to Lucinda G. Auciello at Telephone No. (541) 715-7036, Facsimile No. (541) 715-8581. In addition, all correspondence should continue to be directed to the following address:

Hewlett-Packard Company
Intellectual Property Administration
P.O. Box 272400
3404 E. Harmony Road, M/S 35
Fort Collins, Colorado 80527-2400

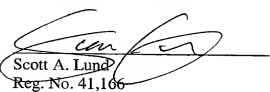
Respectfully submitted,

Jeffery S. Hess,

By his attorneys,

DICKE, BILLIG & CZAJA, P.A.
701 Building, Suite 1250
701 Fourth Avenue South
Minneapolis, MN 55415
Telephone: (612) 573-2006
Facsimile: (612) 573-2005

Date: 2/1/02
SAL:jan


Scott A. Lund
Reg. No. 41,106

"Express Mail" mailing label number EL874326580US

Date of Deposit Feb. 1, 2002

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" services under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Typed Name of Person Mailing Paper or Fee: April Kimpel

Signature: 